

[54] **PRESSURE-RESPONSIVE SAFETY DEVICE FOR AEROSOL DISPENSER AND CONTAINERS EQUIPPED THEREWITH**

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[58] Field of Search **222/80, 396, 399, 179.5, 222/173, 182; 169/31 R**

[56]

References Cited

UNITED STATES PATENTS

3,240,391	3/1966	Garton.....	222/80
3,690,519	9/1972	Wassilieff.....	222/182 X
2,723,056	11/1955	Smith.....	222/396
2,925,937	2/1960	Schmidt et al.....	222/80
3,180,374	4/1965	Muller	222/396 X

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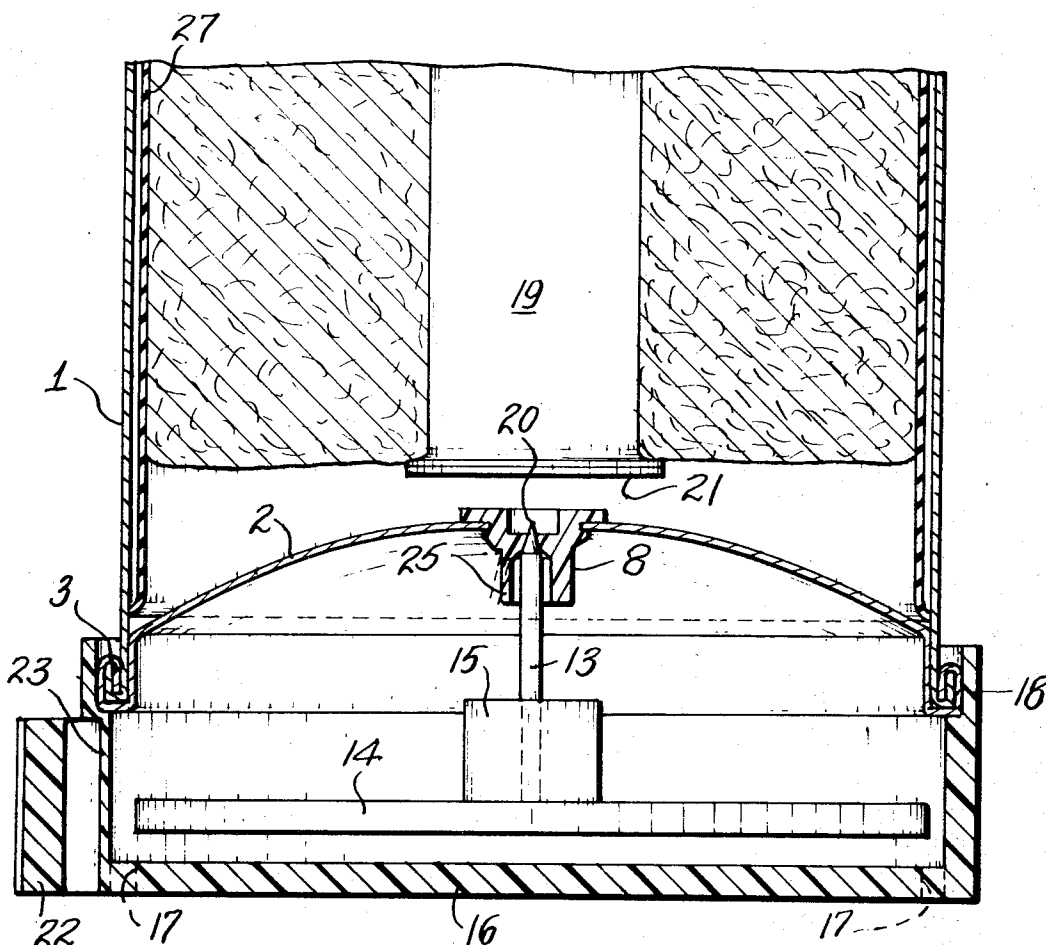
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ABSTRACT

Container has concave bottom, and cartridge of pressurizing gas within it near the bottom. A resilient safety device is seated in the bottom and defines a central hole. A pin is slidably positioned in said hole in alignment with the cartridge so as to rupture said cartridge when depressed. The safety device bulges outwardly when there is excessive pressure inside the container, thus enlarging the hole so that gas can escape around the pin.

4 Claims, 3 Drawing Figures



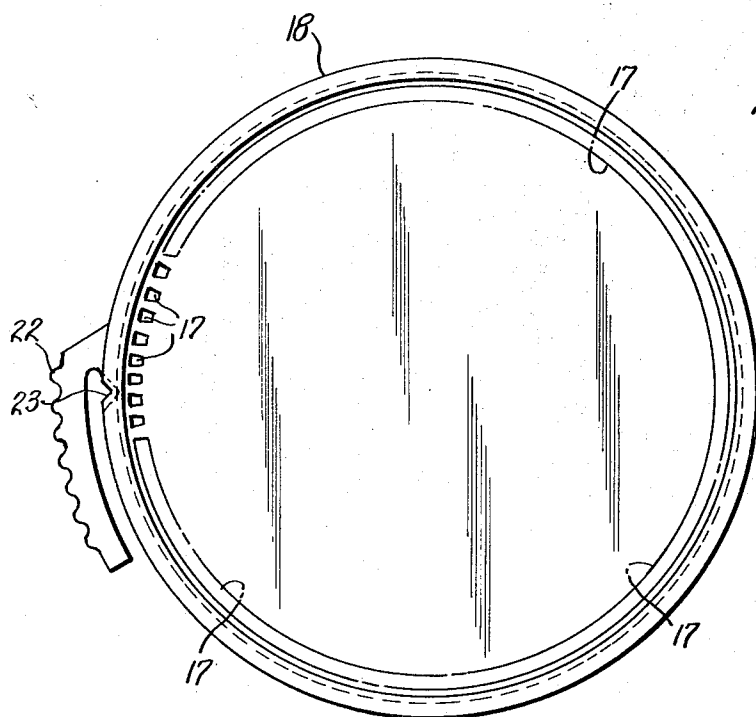
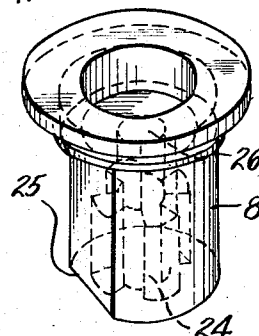
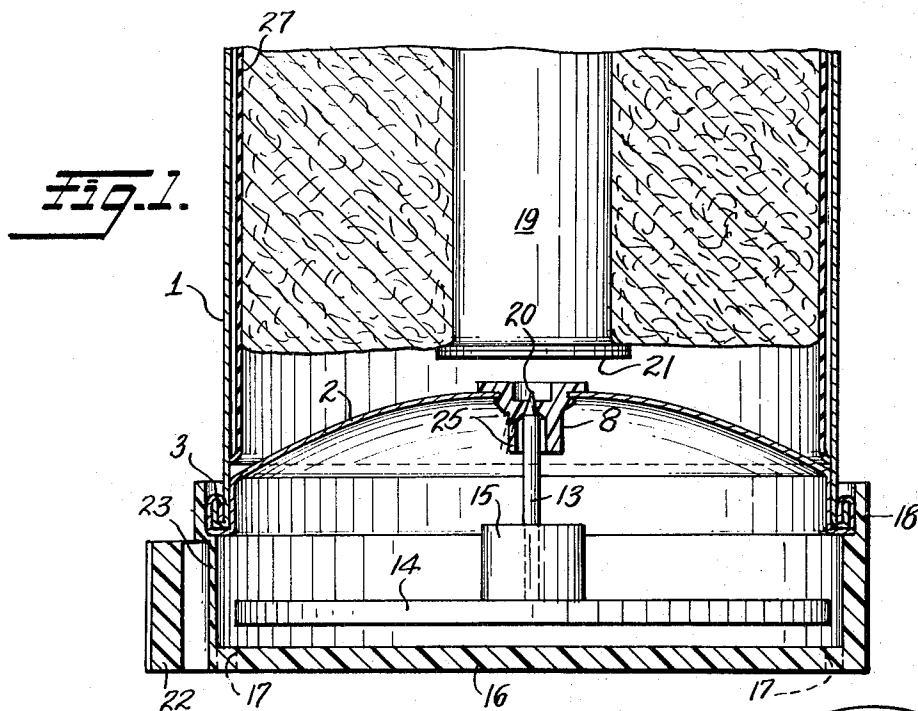


Fig. 3.

PRESSURE-RESPONSIVE SAFETY DEVICE FOR AEROSOL DISPENSER AND CONTAINERS EQUIPPED THEREWITH

This application is a division of our prior application Ser. No. 43,696, filed June 5, 1970.

SUMMARY OF THE INVENTION

Our invention relates to improvements in "aerosol bombs," that is to say commercial spray containers adapted to dispense a product in the form of a fog or mist.

As is well known, these devices have a safety problem during both storage and transportation, when in the hands of the seller, and in the hands of the user.

For any of several reasons, such as mechanical shock, an increase in temperature, or an unexpected chemical reaction, the pressure inside the container may increase substantially, which leads to the danger of an explosion. It has accordingly been found that the use of a safety device is desirable. This device must operate automatically and be always ready to function. On the other hand, the inexpensive nature of these dispensers requires a safety device which does not require any expensive parts in order to secure the required degree of safety.

The present invention has as its object to impart to aerosol dispensers a high degree of safety without substantially increasing the cost of the product.

Specifically, the present invention is intended to provide an aerosol container comprising a safety device adapted to be inserted in the wall thereof, which is essentially characterized by the fact that the safety device comprises an elastic member force-fitted into an opening in the wall of the container and defining, in succession from the inside of the container to the outside, a sealing ring bearing on the inner surface of the opening, and a deformable cylindrical cup having a deformable bottom equipped with a central flexible valve on the side of the cup remote from the sealing ring. A rigid stopper having an external diameter greater than the internal diameter of the flexible valve is inserted in this valve, and blocks it to form a fluid-tight seal when there is a normal difference in pressure between the inside and outside of the container. The cup bottom is, however, adapted to deform, if the difference in pressure increases, thus permitting an escape of fluid toward the outside of the container.

The release of the fluid contained in the container in the case of an abnormal pressure inside it results from the combined effects of the deformation produced by said excess pressure in the deformable cylindrical cup, on the deformable bottom of said cup, and on the flexible valve in contact with the stopper.

In the case of a container of the aerosol bomb type, in which the products to be distributed are not placed under pressure until the moment of use, the stopper may consist of the pin intended to perforate the capsule containing the pressurizing fluid. In this case the flexible valve may have, in addition to its inner sealing diameter, an internally fluted zone having a smaller inner diameter than the outer diameter of the pin which is partially force-fitted therein.

It is obvious that, when the bomb has not yet been placed under pressure, the part of the container holding the cartridge of pressurizing fluid is in direct communication with the atmosphere through the opening in the flexible valve and the spaces between the flutes.

No excess pressure can then be produced in this part of the container. After perforation, the jacket is pressurized, and if the pressure becomes too high, the elastic safety device deforms as has been described, with the perforating pin then acting as the aforesaid rigid plug.

It will be appreciated that the safety device according to the invention, may be applied to any container holding a product under pressure, which may be of a type other than an aerosol bomb, and that the invention is not limited to this particular application of said safety device.

In a preferred method of carrying out this invention, the cup-shaped elastic member is made of a natural or synthetic elastomer having a Shore hardness between 65 and 75. The plug is force-fitted into the flexible valve of the elastic member.

Surprisingly, it has been found that, for an elastic member having the given Shore hardness and a given interior diameter, the opening pressure according to this embodiment remains substantially constant when the diameter of the cylindrical plug varies within certain limits. This pressure increases considerably when the diameter of the plug increases above this stated range. It is thus important to emphasize that when one operates within the range in which the opening pressure remains substantially constant as a function of the diameter of the plug, it is possible, for a flexible valve of a given inner diameter, to use plugs the diameter of which does not have to be determined with great precision. The opening pressure will nevertheless remain substantially the same despite a large tolerance with respect to the diameter of the plug. This possible tolerance as to the diameter of the plug and the flexible valve makes it possible to manufacture the device according to the invention very cheaply.

In order that the invention may be better understood, a preferred embodiment thereof will now be described, purely by way of illustration and example, with reference to the accompanying drawings, in which:

FIG. 1 is a partial axial sectional view through the base of a container of the aerosol bomb type equipped with a safety device, said container being adapted to be placed under pressure at the moment of use;

FIG. 2 is a perspective view showing the safety device use in the container of FIG. 1; and

FIG. 3 is a plan view showing the protective cap for the safety device applied to the container of FIG. 1.

As shown in the drawings a cylindrical valve member 8, of deformable material is pierced by a pointed pin 13 attached to a circular head 14 provided with a socket 15 which acts as a stop. A protective cap 16 is provided with weakened areas 17 and attached by a cylindrical lip 18 which externally grips the circular seal 3 of the bomb. The protective cap 16 has a tear strip 22 and an axial scoring 23.

The container 1 has a concave bottom 2 and holds a movable piston 27 above which the fluids to be dispensed are located. At the lower end of the piston is a cartridge 19 holding a pressurizing fluid. FIG. 1 shows only the lower part of the container and its piston. The point 20 of the pin 13 is located at a distance from the bottom 21 of the cartridge 19 which is less than the distance between the socket 15 and the cylindrical valve 8.

In the elastic deformable member 8, the cylindrical passage provided at the center thereof for the pin 13

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comprises two zones when considered in the direction of penetration of the pin. The first zone, 24 (FIG. 2), is located toward the outer side of the member and is internally fluted, while the second zone 26 is cylindrical. These two zones have a diameter which is slightly smaller than the external diameter of the pin 13. They are provided with a flat 25 in their outer wall. It should be noted that the protective cap 16 introduces a supplementary safety factor by resisting accidental impacts on the head 14, which impacts could provoke premature perforation of the capsule 19 by the pin 13, thus placing the bomb under the predetermined pressure.

When the bomb is placed under pressure at the moment of use, it is operated in the following manner. The user lifts the tear strip 22. The cap 16 tears along the weakened line 23 and the perforation 17 and is easily removed. If pressure is then exerted on the head 14, the point 20 of the pin 13 enters into the passage 26 in the elastic member and perforates the bottom 21 of the cartridge 19. The bomb is then placed under some pressure and the seal between the pin 13 and the wall of the cylindrical zone 26 of the deformable elastic member is sufficient to insure a fluid-tight contact between these members. But if a dangerous excessive pressure is encountered, this tends to impart a hemispherical shape to the safety member which separates the neck part 25 of the valve 8 and provides an escape channel for the gas to the outside of the jacket until the interior of the jacket has returned to a pressure compatible with the safety required by the nature of the

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jacket. The position of the deformed safety member is shown in phantom lines on FIG. 1.

It will, of course, be appreciated that the foregoing embodiment has been given purely by way of illustration, and may be modified as to detail without thereby departing from the basic principles of the invention.

What is claimed is:

1. A container having a concave bottom, a cartridge of pressurizing gas within said container near said bottom, a resilient safety member in said bottom in alignment with said cartridge, said resilient member comprising a web portion defining an aperture and an internally fluted sleeve coaxial with said aperture, and a pin gripped by said sleeve and mounted in said aperture for reciprocation between a position clear of and a position rupturing said cartridge, the flexibility of said resilient member being such that it bulges outwardly to enlarge said aperture and provide an escape passage between said pin and the edge of said aperture in response to a predetermined pressure within said container.

2. A container as claimed in claim 1 comprising a cover covering said concave end and the outer end of said pin, and a tear-strip attaching said cover to said container.

3. A container as claimed in claim 1 in which said sleeve has at least one weakened wall portion.

4. A container as claimed in claim 1 in which said safety member is made of a material having a Shore hardness of 65-75.

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